Computational Semantics

Assignment 2: Model Checking and Lexical Semantics

Difficult sentences:

We define a three place relation— called satisfaction—which holds between a formula, a model, and an assignment of values to variables. Given a model M = (D,F), an assignment of values to variables in M (or more simply, an assignment in M) is a function g from the set of variables to D.

I found this difficult because I didn't fully understand why an assignment of values is a function g. How does g fit into the whole?

Once again, instead of making use of a special sort of variable that is restricted in its interpretation, we have made use of an extra unary relation symbol (here, inanimate) which we insist be interpreted by the individuals in the relevant sort.

I don't understand what is meant here. Maybe because it is the last part of a section which I did not read before because I only use

Assignment 1.1.5.

1. If someone is happy, then Vincent is happy.
$\exists x HAPPY(x) \rightarrow HAPPY(VINCENT)$

2. If someone is happy, and Vincent is not happy, then Jules is happy or Butch is happy.
$\exists x(HAPPY(x)) \wedge \neg HAPPY(VINCENT) \rightarrow (HAPPY(JULES) \vee HAPPY(BUTCH)$

3. Everyone is happy, or Butch and Pumpkin are fighting, or Vincent has a weird experience.
$\forall x HAPPY(x) \vee FIGHTING(BUTCH,PUMPKIN) \vee WEIRDEXPERIENCE(VINCENT)$

4. Some cars are damaged and there are bullet holes in some of the walls.
$\exists c DAMAGED(c) \wedge \exists w BULLETHOLES(w)$

5. All the hamburger are tasty, all the fries are good, and some of the milkshakes are excellent.
$\forall h,f(TASTY(h) \wedge GOOD(f)) \wedge \exists m EXCELLENT(m)$

6. Everybody in the basement is wearing a leather jacket or a dog collar.
$\forall x(BASEMENT(x) \rightarrow (WEARING(x,j) \vee WEARING(x,c)))$

Assignment 1.1.7

1. robber(y)	y = free
2. love(x,y)	x and y = free
3. love(x,y) → robber(y)	x and y and y = free
4. ∀y(love(x,y) → robber(y))	x = free, y = bound
5. ∃w∀y(love(w,y) → robber(y))	w and y = bound

Assignment 1.1.10

1. ∃xlove(x,vincent)	True
2. ∀x(robber(x) → ¬customer(x))	True
3. ∃x∃y(robber(x)∧¬robber(y)∧love(x,y)).	True

Assignment 1.1.11

M=<D,F>
D={d1,d2,d3}
F(VINCENT) = d1
F(BUTCH) = d2
F(JULES) = d3
F(HAS-GUN) = {d1}
F(AGRESSIVE) = {d1,d3}
F(HAS-MOTORBIKE) = {d2}

Modeling

The files for the modeling can be found in the zip-file.

Explanation software tool

To check if a model is well formed syntactically and semantically, a program should have several aspects. First to check the syntax, the system should have rules that check (for example) if there is a period at the end of predicates. Another example that could be checked are non-logical symbols could be checked to see if they have a corresponding WordNet synset.
For checking the semantics, some natural language processing is needed. Using a resource like NLTK, this would be possible.